

POSTFACE

The Historical Heritage of the 19th and 20th Centuries: Techno-science, Markets and Regulations in a Long-term Perspective

Dominique Pestre

This special issue of *History and Technology* has been conceived and written by four French historians. Their approach is radically historical, even if they have in mind, and start from, contemporary questions. Most studies consider the French situation, which does not mean that they limit themselves to it nor that they are uninteresting for other contexts. The text by Jean-Baptiste Fressoz deals with 19th-century discourses around science, progress and risks, and presents the conclusions of several studies on public battles around the production and regulation of techno-scientific products in the early 19th century. The article by Pierre-Antoine Dessaux is on agricultural and food production and regulation, and on the tensions between market organization and health protection at the turn of the 19th and 20th century. The third article, by Nathalie Jas, is on the use of pesticides in agriculture, on the specific forms of regulatory practices that were established throughout the 20th century between professionals, scientists, states and different ‘publics’. The last text, by Soraya Boudia, is on the building of national and international norms to frame the question of low level radioactivity, mainly after the Second World War.

In what follows, I would like to do three things. First I will describe what I consider to be the central interest of each text, what makes them really innovative and essential today. Their strength resides in the questioning of implicit assumptions and categories that partly shape the social studies of science and the field of STS. Then, I would like to quickly comment on the advantage that historical approaches could have in the reframing of the questions we have to tackle at the interface of (techno-)science, markets and politics. Finally, I would like to suggest and defend four theses, namely (1) that it is highly heuristic to look at the 19th century as (already) a market-based,

Dominique Pestre is Directeur d'Etudes, EHESS, Paris, France. E-mail: pestre@ehess.fr

politically regulated 'risk society'; (2) that the (re-)formatting of markets is what primarily matters, over questions of health, environment or precaution, in expert regulation of techno-scientific products; (3) that the acceptability of techno-scientific products is shaped by many institutions and forms of debates and conflicts, and that democratic societies call for these many forms of 'intrinsically biased regulation'; and (4) that the defence of social diversity rather than 'public participation' should be put at the core of our normative postures.

'Risk' and Alkali Production in Early 19th-Century France

The interest of Fressoz' paper is that he questions the obviousness of Ulrich Beck's thesis. More precisely, his claim is that most of the points developed by Beck in his famous book of 1984¹ to characterize contemporary societies seem to be already quite valid for the 19th century. The fact that historians, repeating what the proponents of progress have said in the 19th century itself, have mainly portrayed that century under the guise of a 'history of progress' does not mean that many people were not already conceiving the situation as the emergence of a new kind of society, of an industrial 'risk society'. Fressoz's demonstration is two-pronged. First, he analyses contemporary texts. Commenting on Eugène Huzar writing in 1857, for example, he shows that the author described the emergence of a new social order created by science allied to industry, the coming to age of a system producing radical novelties and new dangers, but without being able to anticipate the results of its own actions. Feeling a responsibility toward the planet, Huzar wants to resist the destructive logic of *that form* of progress (he is not against science and industry) and advocates a global, more reflexive governance of nature and innovation.

Second, Fressoz provides detailed analyses of diverse public controversies. For example, he shows how appeal to public debate was common in the 1820s and 1830s and praised for producing better knowledge since it enrolled a greater variety of competences and interests. He also shows, presenting the case of alkali production around Marseille in the 1810s, how destructive the fumes were considered to be; how farmers launched impressive judicial battles to fight these dangers; how lawyers created a flourishing business out of these trials ('advancing the money for the court fees in exchange for a share of the damages'); how the companies prevented workers from siding with their opponents by importing immigrants; how they were backed, as a result, by their own workers defending their jobs; how populations were divided between pro and con in each village (with their own shops, churches, etc.) and how the people who opposed the companies created and mobilised many kinds of data (including statistical data) to show the consequences of fumes on health, landscape or air and water purity. Fressoz also describes how they fought in court for *moral* damage and under which conditions they won. Heavily fined by courts (when local mobilisation was strong enough and when people understood how to instrumentalize the judicial system), companies then started to change their behaviour and found ways not to pollute as much anymore. In short, this is the story of a reflexive civil society able to enrol many heterogeneous allies to resist state officials, scientists and industrialists who had first decided that business had to go on for the unique sake of progress and economic development.

'Quality' of Products and Market Regulation at the Turn of the Century

Dessaux's article considers the involvement of scientists of various kinds in market regulation around the use of chemicals in food in late 19th and early 20th centuries. As with Fressoz, it appears that distrust of science and techno-products has a long history—that it is the norm, not a recent phenomenon. 'Publics' (and consumers) have always had to be 'made',² and they have had to be convinced that innovation and the introduction of radically new modes of production lead to safe products, that there was an interest in the novelty and that they would benefit from the new system. The specific interests of Dessaux's paper are elsewhere, however. First, he shows that innovation leads to the necessity to renegotiate what 'fair markets' are. Markets, as we know, are not naturally given.³ Norms defining what a fair product and a fair exchange are have to be fixed beforehand. When radical novelties are introduced and when distrust appears among 'consumers' or neighbours, which is quite common, products (and their 'quality') have to be redefined and made explicit. This is of course a complex process in which—as is made clear by Dessaux and does not seem so surprising—the producers play the leading, if not exclusive, role. In theory, no doubt, everybody could contribute to that 'performance'; for the redefinition of most if not all products, however, the actors who *de facto* count are far more reduced. Dessaux's second main point is that what we quickly call 'scientific (or academic) expertise' was never received easily by state, company experts and 'publics'. This is so because professional experts are often there before, because professional experts are not ready to abandon their practical knowledge of production and markets, because they dislike the more 'disconnected' knowledge of academics—and because money and the future of business are at stake in the making of these norms. Finally, this is also so because science is rarely, if ever, an 'independent' institution, because it is part of, and works with larger groups of interests—those of professional people, of industry, of finance, of administration, of the judicial system, of the media or for activists. For companies and politicians in those years, some scientists served the most 'extremist' interests.

In other words, what Dessaux shows is that the main tensions and stakes are not between behind-closed door expertise and 'the public', but between existing economic-legal rules and the innovations that disturb them; between maintaining confidence in changing markets and the need to control and anticipate potential safety problems that could endanger that very confidence; between professional expertise and the newcomers (including scientists studying the effects of the new products and who pretend they could dictate what their quality should be). In such a situation, the solution that emerged (in France but also in other countries, like the USA with the FDA) was to set up administrative/expert commissions that were to register the new products—and so legally define what the new market rules had to be. *De facto*, Dessaux shows, the interests of producers were systematically favoured over those of 'precaution'—the battle outside the administrative frame going on at all levels: local, political, via the press or through court. In other words, the superior interest of national economy (there is 'international competition' that forces us to do as we do) and modern production (based on 'sound science') were regularly given priority by these administrative/expert

bodies that were, anyway, mainly composed of producer representatives and of civil servants nominated by the corresponding ministry (that of agriculture).

Administrative Commissions of Experts and the Registration of Products in the 20th Century

Nathalie Jas largely confirms this analysis in her case. She starts with the fact that registration (*homologation* in French) of products by special commissions has become the standard way, for economic and political authorities in the 20th century, to publicly cope with the fears induced by the introduction of new chemicals into agricultural production. Because of major incidents with poisoning, notably through arsenic, a phytosanitary product largely used in agriculture at the turn of the century; because of public protests, actions by groups of ‘concerned people’ and the press; and because of laboratory and epidemiological studies made by doctors, pharmacists, hygienists and toxicologists about the consequences of chemicals for food safety and workers’ health—decrees and new laws were passed to control the production, distribution and use of pesticides. The solution that progressively emerged was to create commissions of experts to classify and register products in various categories (with specific rules for production and use) and to have bodies of inspectors to control implementation. That body of institutions, regularly recomposed and extended over the century, led to the system that is still globally in use today.

The interest of Jas’ study is that she compared the principles that ground this kind of system—and its obviousness as a fair and rational system of evaluation and codification—with its concrete implementation and long-term effects. Having access to the internal archives of the institutions that were registering products, knowing the concrete practices in companies or workshops and fields, and being in a position to retrospectively evaluate the consequences in terms of production as well as safety—in short, knowing ‘the end of the story’—she proposes not to be naïve about the importance of procedures and to carefully study their concrete implementation in a practical, economic and social context. What she notices most clearly is that registration *de facto* meant, for the whole of the 20th century, and regardless of the rationale of the system and the good will of many people, a subordination of public health to a modern, intensive way of developing agriculture. She claims that, in the public sphere, the system functioned mainly as a rhetorical means to ‘create invisibility’ and ‘make pesticides acceptable’. She shows that, in the long run, the objective was not to centrally protect environment and health but to ‘enhance the use of efficient pesticides in agriculture’. That inversion between avowed objectives and daily practices has its roots in the difficulty of reconciling precautionary attitudes and the interests of agriculture as defined by state officials and local producers eager to fight economic competitors, and the insects that destroy their cultures. More prosaically, that coalition finally won the day because (i) most members of the commissions had close links with agricultural and industrial interests; (ii) the control of related health hazards was only done for new compounds; (iii) various strategies could be used to by-pass negative toxicological results such as postponing a decision or obtaining a

partial agreement that could be progressively extended; (iv) the ministry of health was introduced quite late in the system and (v) the French administration never enforced the law very strictly, notably as far as work conditions were concerned. No doubt, risks of various kinds were regularly reasserted (and certainly believed) as central, but since *arbitration* was always a necessity it was the confidence in the capacity to find ways to circumvent problems in the future through new science and market arrangements—and certainly also immediate interests—that led, most of the time, to decisions in favour of techno-scientific solutions oriented toward ‘progress’.

Controlling and Accepting Radioactivity Risks since the Second World War

In her article, Soraya Boudia also stresses that the main role of administrative regulation is to find ways to cope with the inevitability of progress and of (economic or political) interests, to answer the fears and refusals that the new systems generate by making/showing them safe—or safer, with the creation of new rules. Her suggestion is that, if one wants to understand the meaning of such regulations, one must follow the precise process through which political will (in her case to have bombs that could be tested), economic imperatives (the imperative of nuclear energy) and techno-scientific expertise (of many scientists and engineers) join together in an asymmetrical field of power to cope with contestation and the new risks that had been identified. Through a highly path-dependent interaction, the people that govern—because it is they who define what is untouchable and what could be changed—try and link together a move forward in the direction of technological progress and defence of the military and civil nuclear complex with new definitions of risks, acceptability, usages and norms. In this sense, Boudia questions the very possibility, at least in her case, of a more symmetrical ‘public understanding of science’.

What Boudia also shows (after Jas and Dessaux) is the way regulation is achieved through the invention and mobilization of numbers. Because the risk created by radioactivity is recognized by everybody (at least in broad outline), the pacifying role of scientific experts consists of translating the worries into thresholds, into figures below which safety could be claimed to be achieved for the time being. Through that very process of transforming an open question into a numerically limited one, the whole question is reframed: the issue is no longer to contest the necessity of nuclear development but to define the norms making it ‘safe’ (of course, a highly controversial notion). Because the question of radioactivity is from the beginning a global problem, scientists (a world of competence above national interests!) are used to establish these thresholds at an international level. In this sense, the situation is slightly different from the one described by Fressoz, Dessaux and Jas. In Boudia’s case, international academic science is from the start the key reference, and few professional people could contest it. That does not mean that the interests of the nuclear business and of nuclear nations are not taken care of. On the contrary, if an expert endangers the whole business by proposing too strict norms, if he exceeds the limits tacitly fixed by the nuclear complex, he is generally pushed aside. His clearance is *de facto* withdrawn, he gets no

further access to the data he needs and he loses all influence on the process. Boudia thus clearly demonstrates that the right frame of analysis is not the system of regulation understood in a narrow sense (that of expertise and public debate), but the maintenance of the nuclear complex, the whole of the political/economic business of the civil and military atom. External public mobilisation (including action by people like Linus Pauling and Bertrand Russell) thus emerges as the main condition towards improved safety.

What can Historical Work Teach Us about the Techno-sciences in Society Today?

My first general comment has to do with the interest of historical approaches to better frame contemporary questions.

What has first to be acknowledged is that history does not have an epistemological advantage over any other science; no human can occupy God's position and no place can be imagined from where *the* truth can be told. Everyone is situated in time and space, and everyone has a limited vision of the world—which is of course also true for historians. However, not everything matters in the same way. Certain results, certain claims and narratives are more interesting, more important and more to the point than others. What makes them important or more pertinent is contested and decided by humans and that is precisely what is at stake in the social, political and intellectual public sphere.

Historians, like their social scientist colleagues, are torn between inescapable tensions. An example is the tension between complexity and simplification, between the various worlds in which they have to live and by the impossibility, but necessity to (imperfectly) translate one world into another. More generally, they are torn between description and norms, between romanticizing and indifference, between empathy for 'actors' and adoption of a critical stance, between the obviousness of words and their opacity (their multiple meanings).

More importantly, social scientists and historians are part of power games, of games of legitimisation. Because the world is not a harmonious whole,⁴ historical narratives cannot but give credibility to certain people and interests to the detriment of others. The choice of the most basic categories is central, as is the time frames that are used for comparison. Following actors might be a good starting point, but the list of actors is not a given. It is the analyst who, depending on the spatial, social and temporal frame she considers, *de facto* decides from an infinite list who is pertinent and who is not. A major difference could be made in the 'lesson' we might draw from a story, for example, by simply 'inviting' some more people, groups or artefacts to the table, by proposing new connections or defining new ontologies.

This is well known. The reason it needs to be repeated is that analysts cannot but partly forget it when in the midst of action. When trying to analyse situations, historians and sociologists cannot prevent being 'taken in' by their stories, they cannot but *believe* in the schemes they try to build. There is no universal solution to resolve the tension between knowing one's limits *in principle*, and forgetting them when arguing for a case. There are only very pedestrian ways of coping with that tension: by deliberately conceiving plans or devices to alternate angles of vision from one frame to the next, or

by involving more people in the conversation, notably people from other corners of the world and of the social and intellectual planet.

It is also important to draw attention to the complex relations between history, memory and institutions; it might be that institutions often try and destroy certain memories, to disconnect certain people from their (traditional? local? institutional?) ways of making sense of the world. Major institutions might tend today to claim, for example, that contemporary changes are such that most accumulated knowledge is becoming worthless, that adaptation to 'knowledge society' (definitely a new thing), to 'risk society' (definitely a new situation our ancestors never faced) or to 'globalisation' requires drastically forgetting what we learned in the past. This is not an 'academic' question. It is a question with immediate consequences in terms of identities and of the capability for some people to 'remain in the world'.

Finally, one should stress the difficulty of passing from 'is' statements to 'ought' statements. This is easy to understand as soon as it is realized that 'win-win' situations are not so common and that the 'common good' from which to build normative discourse is at the core of public dispute. 'Ought' statements cannot be derived from (historical or sociological) narratives because they precisely are what is at issue among people and groups, and so among social scientists themselves.

Following these general remarks, what can history contribute? What can historically oriented approaches do and not do? How can historians help in understanding the present and its changes? My impression, and that of the four people who prepared this special issue, is that historians can be of help:

- (i) In instilling doubts about the way situations are commonly described, in multiplying narratives, in restating complexity, in showing the messiness of the past (and of the present) and in undermining policy proposals based on too simple assumptions.
- (ii) In charting the rise to power of grand narratives, in being attentive to the legitimating roles they play in the social body. If one realises that normative proposals implicitly rely on certain ways of putting the present in historical perspective that explain what went wrong *before*, it becomes important to elucidate the blind spots and help alternative readings to emerge.⁵
- (iii) In using historical cases as heuristic tools to revisit contemporary questions, in using them as 'thought experiments' where possible imperfect precedents might contribute to detecting new options for the present.
- (iv) More ambitiously, in indicating possible or likely consequences of policies by relying on what could be called *Retrospective Policy Assessments*. For example, as Fressoz and Jas have done, one could try to compare the systemic effects of different ways of regulating techno-scientific products over time.

This is something historians can do because, in part, they know the 'end of the story' and the effects each regulatory mode tends to have. This works only through analogy but it might be intellectually stimulating if we suppose that institutions have a kind of 'natural slope' that often leads them to specific solutions and results—that they have a kind of historical inertia.⁶

A First Thesis: The 19th Century as Science Based and as 'Risk Society'

Let me now turn to what these four texts tell us about the massive changes that occurred, notably with the second industrial revolution, but also before, with chemicals, gas lighting, power engines, inoculation and vaccination.⁷ In historical terms, three major transformations seem to characterize the 19th century. First, because laboratory sciences introduced new material ways of reconfiguring the world, because they proposed novelities whose consequences could not have been fully anticipated, and because people reacted to these changes with intense jubilation or fear, a situation opened up that still defines our (post-) industrial world. In this sense the present does not look so radically new and 19th-century societies could already be considered as forms of risk societies. The second change is that, in the 19th century, production and commerce started to become international in a far broader sense, leading to challenges we still now face. More products had to be preserved and adapted to resist transportation, for example, the confidence that people could have in these unknown and new products had to be built through new means—and science, *then as now*, was mobilised to build imaginative solutions (like the registration of new products by experts).⁸ The last key change that happened during the 19th century that is still with us, and that appears in all the papers here, concerns politics and political life on the one hand, and governmentality and political/administrative management on the other. The first aspect can be illustrated by a growing capability of people to react and intervene in these issues—in France, for example, through court or *suffrage universel* (in the Third Republic), through a renewed freedom of the press and the extension of education. Second, and precisely to take into account the situation created by the emergence of ever more new techno-scientific products, state power started to partially shift from parliaments to specialised commissions and professional/scientific expert groups inside ministries. The executive part of government and state administration started to play a more active role in social, economic and regulatory terms than before—they started, to repeat Foucault's maxim, to intervene far more directly to *make people live*.⁹

Another way to describe this epochal change is to look at the place taken by science in social life. As we have said, a key aspect of the modernity that the 19th century opened up, and that is still with us, is that techno-science constantly introduces new problems through innovation. In the same move, the sciences, but generally different science formations from the previous ones, appear as tools to *diagnose* these emergent problems and to propose *solutions* that permit the assimilation of progress at a 'lower cost' (in terms of health or environment for example). In so doing, in identifying problems and suggesting solutions, (academic) science becomes truly an integral 'element of the problem'. In the process of proposing its own assessments, it also appears, most of the time, in conflict with other values and interests, notably those of producers, and with other knowledge, notably professional and public knowledge. Progressively, however, it made a place for itself, notably through 'expert committees' of various kinds, through a new, organic, institutionalised alliance with state administrations and economic interests. Finally, part of science started to play a more autonomous 'controlling' role—Dessaux describes such a move with the laboratory of the city of Paris in the

late 19th century—thus contributing to the global move toward the ‘scientification of politics’.¹⁰

A Second Thesis: Re-Stabilising Markets is what Matters in the Scientific/Professional Regulation of Techno-scientific Products

The second major conclusion that emerges clearly from these texts is that ‘organized social interests’ are central in defining what is acceptable and not—notably the organized interests of commerce and production, those of professionals and those of the nations fighting the global economic battle. In the past as now, producers and their representatives from chambers of commerce to professional unions have been at the core of the regulatory process first put into place in the 19th century. Innovation destabilizes markets, it introduces products that do not respect the accepted rules of quality, that threaten consumers’ confidence and that allow for ‘falsifications’ (to take 19th-century parlance) and ‘risks’ (to speak late 20th-century language). Markets have thus to be redefined when innovations emerge and this is commonly done through a re-qualification of products. For economic actors and in many cases for political and military actors too, this is what is centrally at stake in expert processes: to help economic production to adapt, reform and develop, and to help them progress. No doubt possible new dangers have to be tamed, no doubt professionals and academic scientists of various brands help identify the dangers introduced by innovation, but zero-risk societies are a dream and the show, *the central show that is production must go on*. Redefining what makes a ‘good’ product through expert work—and thus restoring confidence—is what counts in the business of registration and in the building of safety norms. The maintenance, the promotion of a renewed, fair and safe commerce, in short, the redefinition of the proper contractual dimension of economic relations, is the question to be solved and it cannot be strictly equivalent with the defence of public health or environment *per se*.

The normative stance—and this comment is central if one has in mind most of today’s literature on governance¹¹—cannot thus be just to imagine the best *procedure* to decide in a *symmetrical* world of *individuals* and ‘*stake holders*’, even if the framing of the public negotiation process deserves thorough attention.¹² The problem is larger from the start and it has to take into account the well-established asymmetry of powers and interests, such as those promoting intensive agriculture or protecting the national economy against unfair competition. This is also why public debate has always gone on in the past, and cannot but go on today, *outside* the confines of the formal decision processes. If one wants to consider alternative ways of organizing the world, if one wants to discuss *who* has to adapt to innovation, the official decision process is not necessarily the best frame. One important corollary is that progress, in terms of safety, has historically been achieved by actions from outside the expert process—by refusals, resistances and contestation. Perhaps Dasgupta is wrong (or too extreme) when he claims that markets and companies are ‘environmentally rapacious’ from a *structural point of view*, for example, but past experience as expressed in the papers of this special issue, suggest he is quite right.¹³

The opposition traditionally built today between a past that was dominated by scientific experts working behind closed doors with the State administration, and a present in which ‘civil society’ has finally succeeded in opening the doors of the decision process also appears as historically illusory, not to say false. Neighbours, farmers, lawyers, hygienists, media, but also scientists, activists, politicians and segments of the social body and of the administration, always intervene under many guises in debates that constantly went beyond, and contested, expert proposals, and these people were decisive in the promotion of safety.

A Third Thesis: Democratic Societies ask for Forms of ‘Regulation’ that are Many and have their Specific Bents

The third thing worthy of notice when reading these texts is that, from the early 19th century on, markets and techno-scientific products were regulated, managed and made acceptable or unacceptable not only through the invention of new commercial and safety norms developed by experts, not only by contestation coming from segments of the social body, but also by other *institutions* such as courts asked to rule on damages claimed by plaintiffs, as shown by Fressoz. More generally, but this is common knowledge, modern, democratic societies, as they have evolved since the end of the 18th century, have called for, and cherished, a multiplicity of independent and parallel ways of ‘regulating’ themselves, a multiplicity of (and an equilibrium between) centres of power. This was derived from principles theorized earlier, by Montesquieu for example when he talked about the balance of power between the legislative, the executive and the judiciary, but also for functional and practical reasons precisely as a result of the growing importance of science and innovation in social life. The way techno-scientific products are socially constructed and made available as safe products, the mechanism through which the social body tries to cope with their novelty and potential dangers, are quite varied. It of course includes expert committees and registration procedures, but it also includes laboratories and metrological centres (to test products—always a controversial matter), material standards and technical devices (today implementing property rights on DVDs, for example), institutions collecting and processing data (from economic data to demography and epidemiology), international organisations (as demonstrated by Boudia), political campaigning and regular elections (something Dessaux shows when mentioning the socialists in France), *post-hoc* sanctions (by consumers or voters), etc.—and of course jurisprudence and courts.

More importantly, these institutions—through which techno-scientific knowledge and products are contradictorily made available or forbidden—are institutions that work according to *different principles*. A court, for example, is attentive to particular situations, to damages that have already occurred. If jurisprudence often enables local court decisions to have a general impact, these decisions are always dictated by the specificity of the case, by a *post-hoc* assessment of particular events implying techno-science through its consequences. An expert group preparing general safety norms for an administration, by contrast, works according to other principles. It proposes general regulations that are supposed to consider all cases to come. It is built using other

criteria, other norms and values, and it often leads to the defence of other interests. There are rarely those of the 'victims of progress', for example, rarely those of health or the environment in themselves—but rather those of a 'general interest' largely defined by national political and economic actors.

When the picture is seen from this large angle, tensions do not seem to be situated with 'science', companies or experts on the one side, 'lay people' and bottom-up action on the other. They also (or rather) appear as tensions between various modes of regulating social relations, between regulations through administrative/expert bodies, through legislative action, through court and jurisprudence, and through administrative modes of control (bodies of inspectors for example) vs a confidence in free markets to raise precautionary attitudes (as with permit markets today). They have always been resolved through (productive) tensions between these many official and legal modes, and different forms of activism and contestation, by neighbours (the NIMBY argument has always been present), by associations acting locally or for global reasons (defending Nature for example), by appeals to various forms of direct democracy or electoral battles, etc.¹⁴

A Fourth Thesis: The Defence of Social Diversity Should be put at the Core of Our Normative Postures

In conclusion, I would like to consider head on what these texts suggest when confronted with the schemes of 'participatory politics' and 'dialogical and technical democracy'.¹⁵ The first thing to say is that these notions are useful and powerful expressions in normative terms. Participatory politics defines a central model for democratic action, a model complementing the more traditional form of representative government (even if it is not historically new and even if it can take many parallel forms). It is a model that should be implemented as often as possible, notably because of its educational virtues. In terms of principles, it encompasses an attractive and positive ideal as Sintomer has clearly shown.¹⁶

However, conceiving decisions in contemporary market-based democracies mainly as the end point of a cycle of debates that can be conducted in a fair (and fairly rational) way and that can lead to more acceptable and robust solutions is a claim that is too simple, for two reasons. Because nothing indicates that a 'better', a more optimal technical choice should emerge when proceeding in this way, and because nothing indicates that it would lead to less conflicting situations in the social body.¹⁷

More generally, reducing the core of democracy (what makes a society a democratic society) to the question of the proper organisation of decision processes is too quick a move—not to say, perhaps, a dangerous one. Nothing seems to prove that the core of an active democratic life resides in devising the best way to collectively decide (on each topic), that *real democracy* (if I may invoke this expression) is best attained in one unique (even if normatively ideal) form of democratic participation and deliberation.¹⁸ It might well be that democracy first requires the active maintenance of parallel forms of regulation (who could contest the right of going to court to have a decision reversed? or who would deny the right to politically reverse a choice through an election?). It also requires the protection of alternative ways of making worlds (protecting today's

open software movement from private companies trying to eliminate it), the defence of ‘dissident groups’ (able to go on with their expertise and publicize it), the promotion of *post-hoc* assessments and control—the need to give more importance to what Rosanvallon recently called *la démocratie de surveillance* (a vigilant democracy).¹⁹ More ambitiously, one might try to imagine the kind of general ‘constitution’ that would be adapted to our market-based, democratic, contemporary, ‘knowledge societies’.

The parallel idea that ‘civil society’ should play a central or renewed role in the management of techno-science in/and society is also an interesting normative posture and a heuristically illuminating notion. It is decisive, in particular, if it means the less organised but nevertheless active and burgeoning ‘mass of the people’ trying to manage their own problems, alongside the world of business (and its norms and logics), the world of the organized institutions of the democratic state (from courts to administrations, from science and university to regular democratic elections), and the new global institutions that now manage a large portion of world relationships (like the WTO). If the idea is to favour the active presence of ‘ordinary citizens’ in the management of the *polis*, if it is to help them articulate their doubts and hopes and build their own expertise, then the notion is certainly central.

However, there is no doubt that the need to have civil society participate in all decisions can now be found everywhere; at least in Europe, most institutions now repeat it and have devised means to integrate that not so new ‘civil society’ into their usual functioning (the European Union has been central in this move). In this sense, integrating civil society has also become a technology of government, a recognised form of governmentality. In the same frame, ‘participation’ assumes, of course, another meaning. What seems to characterize it today, when looking at the concrete technologies that are developed, is the combination of a universal call for a government of the self with the elaboration of an homogenised set of behavioural norms. External audits and scanning of populations have not disappeared, far from it, but the new governmentality, what we might call its ‘neo-liberal brand’, relies on the active participation of everybody in the making of more efficient ‘attitudes’, it rests on the ‘collective’ identification of ‘the best practices’ as reference points for everybody to correct themselves. Such technologies now run from benchmarking to the Open Method of Coordination and ethics, and their fields of action include academia (for promoting ‘excellence’ and ‘elite’ institutions), medicine (for example through evidence-based medicine), but also the ‘politics of life’, business, social management, international institutions, NGOs and states. Studying this neo-liberal form of governmentality is definitely a new frontier we should put at the core of our studies.²⁰

Notes

- [1] Beck, *Risk Society*.
- [2] Schaffer, ‘Public Experiments.’
- [3] For two good, recent books on this point, Stanziani, *Histoire de la qualité alimentaire*, and MacKenzie *et al.*, *Do Economists Make Markets?*
- [4] Butler *et al.*, *Contingency, Hegemony, Universality*; Laclau and Mouffe, *Hegemony and Socialist Strategy*.

- [5] Moreau Defarges, 'Gouvernance' constitutes a good example of such a study.
- [6] This whole section relies on Pestre, *Science, Society and the Political*, a report for the EU Directorate Science and Society that summarizes a two-day workshop discussion.
- [7] The Ph.D. thesis of Jean-Baptiste Fressoz, 'Les processus d'innovation au XIXe siècle,' details these early 19th-century changes.
- [8] Stanziani, *Histoire de la qualité alimentaire*.
- [9] On the first point and on the French case, the trilogy of Rosanvallon, *La crise de l'Etat providence*; *La nouvelle question sociale* and *L'Etat en France* are the key references. On the second point, the seminars of Foucault at Collège de France, *Il faut défendre la société*; *Naissance de la biopolitique* and *Sécurité, Territoire, Population* remain essential despite Dean, *Governmentality*; Barry *et al.*, *Foucault and Political Reason*; Lascoumes and Le Galès, *Gouverner par les instruments*; Senellart, *Les arts de gouverner*; Zancarini, *Lectures de Michel Foucault* and many other texts.
- [10] On that aspect, Ezrahi, *The Descent of Icarus* remains central.
- [11] The immense literature produced by the EU commission over the last decade constitutes a wonderful material to document that aspect. See also Boltanski and Chiapello, *The New Spirit of Capitalism*.
- [12] On the central role of *deliberation* in democratic process, see Elster, *Deliberative Democracy*; Manin, 'Volonté générale ou deliberation?' and *Principe du gouvernement représentatif*; Urfalino, 'La décision par consensus apparent,' and Sintomer, *Le pouvoir au peuple*.
- [13] Dasgupta, 'Science as an Institution;' and Pestre, *Science, argent et politique*.
- [14] Jas, *Au carrefour de la chimie*.
- [15] Callon *et al.*, *Agir dans un monde incertain*.
- [16] Sintomer, *Le pouvoir au peuple*.
- [17] Stirling, 'Opening Up or Closing Down.'
- [18] Manin, 'Volonté générale ou délibération' remains central in that respect.
- [19] Rosanvallon, *La contre-démocratie*.
- [20] Bruno, 'Déchiffrer l'«Europe compétitive»'; Borraz, 'Les normes, instruments dépolitisés'; Timmermanns and Berg, *The Gold Standard*; Woolf *et al.*, 'Clinical Guidelines.'

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